

Final Review 1

1) "Speed" Test (No calculator)

a) $\cos(30^\circ)$

b) $\cos(5\pi/4)$

c) $\sin(45^\circ)$

d) $\cos(\pi/3)$

e) $\sin(\pi/6)$

f) $\tan(\pi/4)$

g) $\cos(150^\circ)$

h) $\tan(\pi/2)$

i) $\sin(60^\circ)$

j) $\cos(270^\circ)$

2) Find all values of x over the interval $[0, 360^\circ)$. (No calculator)

a) $\sin(x) = \frac{\sqrt{2}}{2}$

b) $\cos(x) = \frac{\sqrt{3}}{2}$

c) $\tan(x) = -\sqrt{3}$

d) $\sec(x) = -\sqrt{2}$

e) $\cot(x) = -\frac{\sqrt{3}}{3}$

f) $\sin(x) = \frac{1}{2}$

g) $\cos(x) = -1$

h) $\tan(x) = 1$

3) Find a value of x in the interval $[0, 90)$ that satisfies each statement.

a) $\sin(x) = 0.84802194$

b) $\cot(x) = 1.2575516$

c) $\sec(x) = 2.7496222$

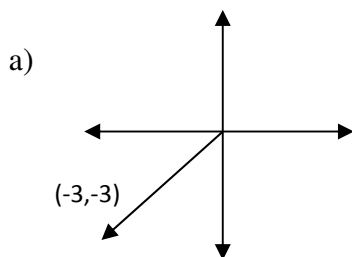
4) Find all trigonometric function values for each angle.

a) $\cos\theta = -\frac{3}{5}$, in quadrant III

b) $\tan\theta = -\frac{15}{8}$, in quadrant II

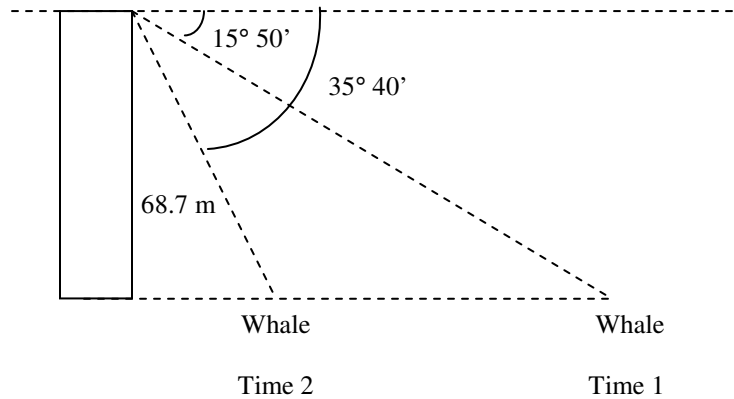
5) A pulley is rotating 320 times per minute. Through how many degrees does a point on the edge of the pulley move in $2/3$ seconds?

6) Find the values of the six trigonometric functions for each angle in standard position having each point on its terminal side.

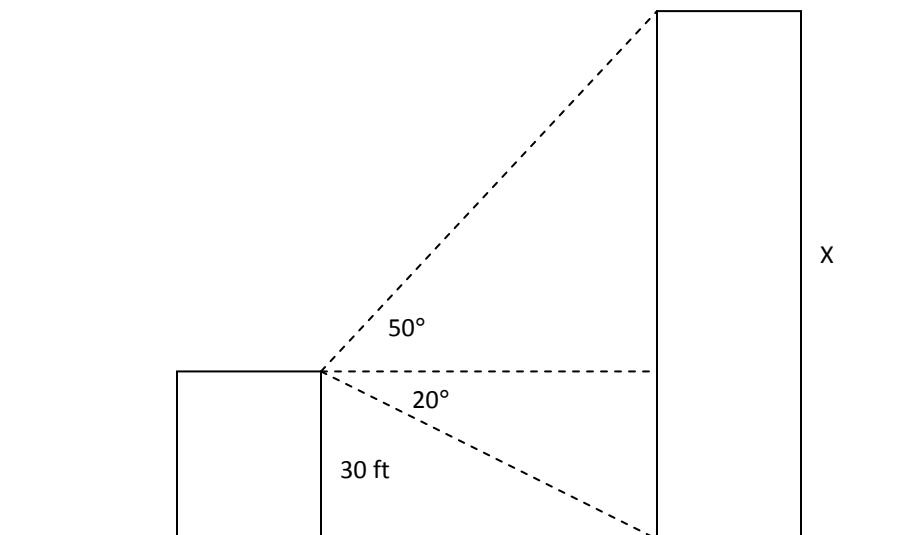


b) $(9, -2)$

- 7) A marine biologist is watching a whale approach directly toward a lighthouse as she observes from the top of the lighthouse. When she first begins watching the whale, the angle of depression to the whale is $15^\circ 50'$. Just as the whale turns away from the lighthouse, the angle of depression to the whale is $35^\circ 40'$. If the height of the lighthouse is 68.7 meters, find the distance of the whale as it approaches the lighthouse.



- 8) From a window 30 feet above the street, the angle of elevation to the top of the building across the street is 50.0° and the angle of depression to the base of the building is 20.0° . Find the height of the building across the street.



Linear and Angular Speed (for extra practice see p. 104 # 19-23, p. 39-41)

- 9) Find the length of an arc intercepted by a central angle of $3\pi/4$ if the radius of the circle is 20 inches. Show your steps, including any equations you used.
- 10) A CD rotates at 200 rpm when reading at the edge of the CD. The radius of a CD is 6cm.
- a) Find the linear speed of the object in cm per second.
 - b) Find the angular speed of the object in radians per second.
- 11) A bike has a front sprocket with a radius of 5 inches and a back sprocket of 2 inches. The back sprocket drives a wheel with a radius of 13 inches. If I can pedal at 90 revolutions a minute,
- a) Find the angular speed of the big and small sprocket.
 - b) Find the linear speed of a point on the edge the tire in inches per second.
 - c) Find the speed in miles per hour.

Wind and River Problems (Do these both with vectors and parametrically)

- 12) An object is moving at a speed of 10 units/sec, at an angle of 30° to the x-axis. What are the horizontal and vertical components of this motion?
- 13) A pilot heads from Memphis, Tennessee, toward Albuquerque, New Mexico. The cities are 1000 miles apart; Memphis is due east of Albuquerque. The plane flies at 250 mi/hr, and there is a constant 20 mi/hr wind blowing toward the south. What angle and heading should the pilot set so that he actually lands in Albuquerque and is not blown off course?
- 14) A plane is headed from Memphis to Albuquerque, which is 1000 miles due west. The plane flies at 250 mi/hr, and there is a constant 20 mi/hr wind blowing toward a heading of 135° . Where will the plane end up (after flying 1000 miles west) if the pilot does not compensate for the wind?
- 15) What angle adjustment should the pilot in Problem #3 make in the flight so that he will land in Albuquerque?

Answers to Final Review 1 '0910 – Trigonometry

Speed Test:

- a) $\sqrt{3}/2$ b) $-\sqrt{2}/2$ c) $\sqrt{2}/2$ d) $1/2$ e) $1/2$
- f) 1 g) $-\sqrt{3}/2$ h) undef. i) $\sqrt{3}/2$ j) 0

Wind and River Problems:

See page 289 in the green Algebra 2 book

Linear and Angular Speed

- 1) 15π or about 47.12cm
- 2) a) 40π or about 125.66 cm/sec
b) $20\pi/3$ or about 20.94 radians/second
- 3) a) $W_B = 3\pi$ $W_S = 15\pi/2$
b) $195\pi/2$ inches per second
c) About 17.4 miles per hour